1982

G82-618 Grapes: Cultivars, Training and Pruning

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G82-618-A
(Revised December 1989)

Grapes: Cultivars, Training and Pruning

Planting and caring for grapes both are covered here.

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Grapes have long been a favorite fruit of the home gardener. The earliest settlers in the New World found wild grapes thriving along streams and in timbered areas. These were mostly of the species *Vites labrusca* and *V. riparia*, while the wine and dessert grapes of the Old World are *V. vinifera*.

Although it is not without its challenges, adapted cultivars of grapes can be grown in Nebraska. Many of these are a result of both American and French breeders' efforts to combine the hardiness characteristics of the native American grapes (*V. labrusca*, *V. riparia*, *V. rupestris*) with the high quality inherent to the European (*V. vinifera*) types. In addition to the American hybrids, some French hybrid cultivars, such as "Leon Millot," are adapted to southeastern Nebraska. Cultivars of *Vitis* and Muscadine (*V. rotundifolia*) grape cultivars are not adapted to Nebraska.

Plant grapes in a sheltered, warm, sunny location. Avoid low areas where a late freeze may injure the plants and eliminate that year's fruit crop. The ideal site is a gentle slope to the south on a soil with excellent internal drainage. Sufficient water to irrigate the crop should be available.

Drip or soaker irrigation systems are effective for grapes. Avoid a site where 2,4-D exposure is likely.

Several early to mid-season cultivars are adapted to southeastern Nebraska, but in northwest and north central Nebraska only short season, winter hardy cultivars, such as "Beta" or possibly "Valiant," are likely to mature their wood and fruit and survive. Only experimentation will prove whether some of the less hardy cultivars are adapted to a particular site.

Training systems that allow you to remove the plant from its trellis and cover it for winter protection increase

the number of cultivars you can grow. This practice increases your success in obtaining satisfactory yields, but requires additional knowledge and care. For most people, selecting winter hardy cultivars and growing them in an ideal site may be the better approach.

Suggested Cultivars For Trial
(This is not an inclusive list)

American Hybrids Blue-Black

- ***Alden***-- late mid-season, very good quality when fully mature wine or dessert, large, meaty berries, cluster thin, trial for southeastern Nebraska
- ***Bath***-- mid-season, fair to good quality, dessert, Concord type, cluster thin, generally hardy in eastern Nebraska
- ***Bluebell***-- early to mid-season cultivar, excellent juice grape, should be hardy in eastern Nebraska, trial in central Nebraska
- ***Buffalo***-- early mid-season grape, excellent dessert quality, not consistently hardy in eastern Nebraska
- ***Fredonia***-- mid-season, good quality, dessert, Concord type, generally hardy into central Nebraska; McCampbell is a large fruited type of Fredonia
- ***Steuben***-- late mid-season, very good quality, dessert, wine, sweet, spicy berry, for southeast
- ***Valiant***-- early season, fair to good quality, small clusters, superior in flavor to Beta, for trial in northwestern Nebraska

White

- ***Edelweiss***-- early, fair to good quality, dessert, wine, hardier than Ontario, strong *V. labrusca* flavor when fully mature
- ***Himrod***-- early, seedless, excellent quality, dessert, trial for eastern Nebraska although occasionally produces in selected sites further west (may require winter cover)
- ***Kay Gray***-- early season, berries, juice and low acid, good eating quality, trial in central Nebraska
- ***Ontario***-- mid-season, good to very good quality, subject to fruit rots, dessert, for southeastern Nebraska

Red

- ***Delaware***-- mid-season, excellent quality, wine, dessert, hardy in eastern Nebraska
- ***Reliance***-- early, seedless, good quality, dessert, raisin, hardiest of the seedless grapes
- ***Swenson Red***-- early, very good quality, dessert, wine, some degree of winter injury common in southeastern Nebraska; leave fruit on vine till fully colored

French Hybrids
Cultivars for Red Wine or Juice

- ***Chancellor***-- mid-season, produces excellent full-bodied wine, susceptible to downy and powdery mildew, hardy eastern Nebraska
- ***Dechaunac***-- mid-season, requires cluster thinning, good disease resistance, hardy in eastern Nebraska
- ***Leon***-- (two clones available) early, produces high quality
- ***Millot***-- red wine, especially Foster clone
- ***Marechal Foch*** early, produces excellent burgundy type wine, hardy in eastern Nebraska

Cultivars for White Wine

- ***LaCrosse***-- mid-season, similar to Seyval Blanc but makes a fruitier wine, may require winter protection
- ***Seyval Blanc***-- mid-season, good disease resistance, requires cluster thinning, for trial in southeastern Nebraska; may require winter protection
- ***Vignoles***-- mid-season, very good quality, fruit subject to rot, generally hardy in southeast Nebraska, although yields are low

The University of Minnesota has an active plant breeding program. Serious hobbyists may consider joining the Minnesota Grape Growers Association (6133 Oak Lawn Ave., Minneapolis, MN 55424) to keep up with their research publications and cultivar releases.

Pruning and Training Grapes

To have productive grape vines that produce quality fruit, the vines must be trained and pruned to a definite system. Compared to other fruit plants in your garden, grapes are pruned rather severely. To properly prune a grape plant, you must understand some basic terminology pertaining to grapes:

- ***Arm or Cordon***-- short branch of wood extending laterally from trunk;
- ***Cane***-- one-year-old fruiting wood;
- ***Cane bud***-- located at a node on the cane, it produces the fruit shoot;
- ***Internodes***-- the portion of a stem between two nodes;
- ***Node***-- joint on a shoot or cane where buds and leaves are located;
- ***Renewal spur***-- a cane pruned to two buds;
- ***Shoot***-- current season growth of wood from bud, produces leaves, flowers, and fruit;
- ***Spur***-- a cane pruned to four or fewer buds;
- ***Sucker***-- a shoot that develops from the lower trunk or from under ground.

Knowing the fruiting habit of grapes is essential to properly understand grape pruning. Buds on one-year-old dormant wood (canes) produce next year's shoots on which the fruit clusters or bunches develop. Each shoot

produces from zero to four or more bunches.

There are many training systems for grapes. Each has its own advantages and disadvantages. In addition, some systems are better adapted for one cultivar of grape.

While the four-cane Kniffen system is probably the most widely used training system in Nebraska for American hybrid grapes, there are other training systems that are probably superior. The Single Curtain Cordon system, either High or Low wire, is probably the best single training system for most of our grape cultivars.

Single Cordon Curtain

Buy grade number one, one-year-old plants. Plant dormant grape vines in the spring, two weeks before the last spring frost is expected. A permanent mulch system should be considered, using black plastic, wood chips, or straw mulch.

The space required per plant varies with the cultivar grown, the fertility of the soil and the management system followed. In general, plant the vines 5 to 8 feet apart in the row, with 7 feet between rows. Plant the vines at the same depth as they were in the nursery, with the roots radiating out from the crown. Prune each dormant plant to a single cane, then head that cane back to two or three strong buds. Bleeding (sap flow) from cut surfaces will not harm the plants.

Shoots will arise from the remaining buds. Select the most vigorous two or three shoots and tie them loosely to a temporary 5 foot stake set next to the plant. Remove all other shoots. One or two of the remaining will become the trunk (or trunks) of the plant.

Erect a permanent trellis. References at the end of this text provide a detailed explanation. For a High Cordon, set durable wood or steel posts 16 to 20 feet apart in the row and run two strands of galvanized wire between the posts, one wire at 6 feet above the ground. Use number 9 for the top wire and 11 for the lower one.

In the Low Wire Cordon system the lowest wire is 42 inches above the ground. This system is best use for cultivars with an upright growing habit.

One disadvantage to the Low Cordon system is that the new shoot growth in the spring is close to the ground and susceptible to frost. Since the shoots are trained upward in the Low Cordon Wire system, some type of catch wire system should be developed. One method is to have three wires spaced 10 to 12 inches apart above the Cordon wire. The shoots are tied to each wire as they develop.

Cordon systems require strong support, so use strong wire (#9) for that part of the trellis system that bears the greatest weight.

In the Cordon pruning system the trunk is developed to the top wire. This should generally be accomplished in one growing season. The following year, two lateral cordons (arms) are directed along the wire, in the row direction. Usually these cordons extend plants 4 feet in each direction (8 foot spacing); secure cordons to the wire by plastic ties. In the single Cordon, all growth is produced on one cordon so the vigorous American hybrids can be spaced further apart in the row. For some cultivars this can be as much as 14 feet apart.

Once the horizontal cordons are developed, fruiting spurs of two to five buds are retained along the length of the cordon, plus single bud renewal spurs. Leave two to three buds per foot of cordon for large clustered cultivars, such as "Alden" and "Chancellor," and three to four buds per foot of cordon for small clustered cultivars, such as "Leon Millot."

As with any system of training, it is important that the foliage be exposed to sunlight. Numerous layers of

foliage result in reduced yield and poor fruit quality for the current season, as well as in subsequent seasons.

For maximum exposure of leaves to sunlight, position the shoots, which means separate the shoots by hand in the High Cordon systems so they hang freely and do not overlap. Wait until plants are in full bloom before beginning this process. Shoots break off easily if separated before this time.

Some plants are too vigorous for this training system, producing excess vegetative growth. The Geneva Double Curtain or some other system should be used (see references).

In the Low Cordon system position the shoots as you tie them to the catch wires.

Training Systems for Tender Cultivars

One of the training systems for a horizontally trained trunk is the Fan System. This system establishes the head portion at the end of the trunk where three to four fruiting canes and one to two renewal spurs are selected each season.

At the beginning of the growing season, prune the fruiting canes to 12 buds and tie them to trellis wires. At the end of the growing season, force downward below the trellis both the fruit canes and upright trunk. Pin the trunk and canes to the ground for winter protection and cover the plant with a mulching material. Be sure to provide for rodent control under the mulch material.

As soon as the vine is uncovered in the spring, tie up the plant to avoid frost damage to the buds.

Pruning

Although rules and definitions have been made for the task of pruning, each vine has its own individual character, growth habit, and specific response to the growing site. Thus, while there are rules to follow, pruning does require the grower's judgment. Mature vines, if properly pruned and managed, should produce from 5-20 lbs. of fruit per vine, depending on the cultivar and quality desired.

Select the best fruiting canes that a specific vine provides you. In general, fruiting canes in the exterior canopy positions are more productive than interior ones.

Select canes that have long internodes (seven inches or longer) and dark mahogany color. Research done in Michigan and New York has provided pruning formulas for the number of buds to leave on a vine. This is based on an estimate of vine vigor. Vine vigor is determined by the weight of one-year-old cane prunings (balanced pruning).

For example, with "Marechal Foch" or "Leon Millot," growers leave 30 buds for the first pound of cane prunings, and 10 buds for each additional pound of prunings.

Cluster Thinning

Cluster thinning (removing flower bud clusters) produces high quality fruit, maintains plant vigor, and eliminates one cause of winter injury -- over production. To obtain the maximum benefits from thinning, hand-remove clusters before fruit development.

The amount of thinning required depends on the cultivar, plant vigor, and age of the plant. Remove all clusters from the vine the first two years. For French hybrids older than two years, allow one cluster per vigorous shoot for large bunched cultivars. Small clustered cultivars like "Leon Millot" may not benefit from cluster thinning. For American hybrids, allow two to three clusters per vigorous shoot. See references for

additional details.

Neglected Vines

Where vines are overgrown or the trunk is no longer producing vigorous shoots, you can start a new trunk. To do this, select a cane originating near the base of the plant. Prune this cane to 4 feet and tie it to the trellis. After two years' growth, remove the old trunk and establish your desired training system from this new trunk.

Propagation

Commercial producers should purchase certified virus-free plants from a reputable dealer. This ensures their enterprise will begin with vigorous, disease-free plants.

Plant grafted stock of French and American hybrids if you are replanting a commercial vineyard, if soilborne pest problems occur, if you are planting in high pH or alkaline soils, or if the cultivars lack vigor on their own root systems.

Most grape cultivars grown in Nebraska are usually propagated by hardwood cuttings, rather than grafted like those grown in California.

Collect dormant cuttings from healthy plants in late fall after the leaves have dropped off. One-year-old canes (new shoots that grew the previous summer) that are 1/3 to 1/2 inch in diameter with 4 to 6 inch long internodes are best suited for cuttings. Each cutting should have three buds.

The basal cut (the one closest to the trunk) is made just below the lower bud. The upper cut is made 1 to 2 inches above the top bud. The cuttings have an "up" and "down" side, so be sure to keep them straight. The differences in the cut locations can help distinguish the ends.

Insert the cuttings in garden soil that has been prepared with organic matter earlier in the fall. The basal and center buds should be below ground, with the top bud 2 to 3 inches above ground. There is no evidence that using rooting hormones is of any advantage.

Plant the cuttings 6 to 8 inches apart in rows 3 to 4 feet apart. Approximately 50 percent of the cuttings will successfully root, so plant twice as many as you need.

After inserting the cuttings, thoroughly water the site. When the soil has frozen (about Thanksgiving), mulch the site with 6 to 8 inches of straw or other organic matter to prevent soil heaving caused by winter freezing and thawing.

Although rooting will not take place in the fall, callus tissue will develop. You also are assured that the cuttings have the earliest possible start in the spring.

The cuttings are very susceptible to drought during the first growing season. Water as necessary and control competing weeds, diseases, and insects. The plants can be dug the next spring and moved to their permanent location.

For more information, refer to:

Grape Growing, Bulletin 509, available from the Cooperative Extension Service, The Ohio State University
Wine Growers Guide by Phillip M. Wagner, Alfred A. Knopf, 1980
Growing Grapes in Minnesota by The Minnesota Grape Growers Association, 6133 OakLawn Ave., Minneapolis, MN 55424.

Suggested pruning formula for various grape cultivars.[d]

Grape Cultivar	Formula[c]
Aurore (S.5279)	15 + 10
Catawba	20 + 10
Chancellor	20 + 10[ab]
Concord	30 + 10
De Chaunac (S.9549)	20 5[ab]
Delaware	20 + 10
Maerdal Foch and Leon Millot	30 + 10
Fredonia	40 + 10
Seyval (S.V. 5276)	10 + 10[ab]
Vignoles (Ravat-51)	20 + 10[b]

[a]Require cluster thinning to reduce crop and prevent overbearing. Thin to one cluster/shoot before bloom, leaving the basal cluster.

[b]The pruning formula given is tentative and based on research or experience under other than Nebraska conditions.

[c]First number in column refers to buds to retain for first pound of year-old wood removed. Second year indicates additional buds to retain for each additional pound of one-year-old wood removed.

[d]For additional explanation see *Basic Guide to Pruning*. American Wine Society, 4218 Rosewold, Royal Oak, MI 48073.

File G618 under: HORTICULTURE
B-8, Fruits
Revised December 1989; 10,000 printed.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.